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Plant sedaDNA reveals grassland change on the Northeastern Tibetan Plateau during the past 17 ka

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Grasslands on the northeastern Tibetan Plateau are particularly sensitive to changes in climate and herbivory. As two main compositions, Poaceae and Cyperaceae supply forage and support herbivory survival. However, to taxonomic resolution restriction of traditional plant proxies, the plant composition and richness change of vegetation in particular of Poaceae and Cyperaceae are still largely unknown. Here, we reconstruct the vegetation using Lake Donggi Cona sediment ancient DNA metabarcoding, targeting chloroplast trnL P6 loop (g h primer). To increase Poaceae and Cyperaceae taxonomic resolution we currently also investigate ITS1 of nuclear ribosomal DNA in Poaceae and Cyperaceae. A total of 257 terrestrial higher plant taxa, 14 Pteridophyta taxa and 9 aquatic taxa were detected. Before ca. 12.6 cal ka BP, Asteraceae dominate terrestrial plant communities, which are commonly associated with cold and arid conditions during the late glacial; after 12.6 cal ka BP, Asteraceae abundance decline, Poaceae, Rosaceae, and Salicaceae abundance increase likely related to an increase in precipitation and temperature. At 6.5 cal ka BP, the Asteraceae abundance increase, Poaceae and Salicaceae abundance decrease, which is possibly related to cold and dry environments. The plant richness increase sharply since 6.5 cal ka BP and continually maintain relatively high richness values, which may be related to herbivory. Our analyses combine different plant sedaDNA markers will help to elucidate vegetation shifts in the past with deeper taxonomic resolution and provide reference on grassland protection under future climate change scenarios.